Job Risk Assessment

Document Control No.: ***WRA-08-3***	**Date Completed:** 6/15/2010	**Location:** Yerington Mine Site
Project Name: **Vadose Zone Investigation Work Plan Geoprobe Drilling and Soil Core Collection and Lithologic Logging**	**Job Description:** At the 13 borehole locations in the Process Areas, a geoprobe drilling rig will initially be used, prior to sonic core drilling, to: 1) optimize soil sample collection in the upper, most dynamic section of the soil column with respect to moisture content and hydraulic properties; 2) identify any lithologic horizons that may modify the planned geotechnical or geochemical sample collection intervals; and 3) allow geotechnical samples to be immediately preserved to minimize soil moisture losses prior to shipment to the laboratory.	**Risk Assessment Leader:** Penny Bassett **Risk Assessment Team:** Don Hansen (Boart), Chad Haley (BC) **WRA Reviewed & Authorized to Proceed:** **SIMOPS:** ☑YES ☐NO **Designated PIC:** To be determined

Work Plan (List Job Steps) List the jobs required to complete the project scope in the sequence they are carried out.	Any tools or heavy equipment needed? If YES, What Type	Is this a SIMOP? If YES, Include in Mitigation Plan.	Do any of the *Golden Rules of Safety* apply? If YES, Which of the 8?	Which of the 8 energy or biological root sources could possibly be involved in this job?	**What** would be the result of exposure to a biological or energy source? (e.g., Bites, Slips, trips, falls, exposures, electrocution, injury, death, etc.); and **How, where, or when** could an uncontrolled release or unwanted contact with a biological or energy **Note:** Humans are biological sources, and their physical abilities, competency, and training should also be considered here.	Environmental Impacts Could there be a release to the air, soil or water, and or, will a waste be generated? If YES, What?	Pre-Mitigation Risk Evaluation Frequency	Consequence	Likelihood	Risk Score	Permit(s) Required? If YES, What kind?	Energy / Biological / Waste Management Plan List control measures required to eliminate, control, or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental Impact. **Hierarchy of Controls:** Elimination, Substitution, Isolation, Engineering/ Administrative, PPE	Who is responsible for Hazard Mitigation? Name or Title	Post-Mitigation Risk Evaluation Frequency	Consequence	Likelihood	Risk Score
General Hazard: Biological - Stinging insects - Scorpions, snakes	**No**	**No**	**No**	Biological	**Insects:** Insect stings can cause allergic reaction, even in those not previously known to be allergic. Can cause respiratory distress, itching, pain, rash. **Scorpions/snakes:** Scorpion sting is a lot like a wasp sting, very painful; can be very hard to see until you are right on them; tend to be most active a dawn & dusk.	**No**	Unusual Exposure	Serious Consequence	Unusual but possible	Low Risk	**No**	**Insects:** Identify workers with special sensitivities and be prepared with emergency treatment; keep Sting-Ez at job site to provide relief from pain and rash; monitor worker for worsening reaction for ~2 hrs. **Scorpions/snakes:** Inspect work area before setting up; rattle nearby bushes with stick.	All workers	Unusual Exposure	Important Consequence	Conceivable but unlikely	Minimal Risk
General Hazard: Driving - Mine site roads - Public roads in town (low speeds) - Public highways (high speeds)	**No**	**No**	**Yes** Driving Safety	Motion Biological	**Mine roads:** Areas with steep embankments; potential heavy equipment on roads. **Town roads:** Low speed collision with other drivers or pedestrians; drunk drivers. **Highways:** High speed collision or loss of control with v. serious consequence; drunk, reckless, or distracted drivers.	**No**	Frequent Exposure	Very Serious Consequence	Unusual but possible	High Risk	**No**	***All Driving: No use of cell phone or other distractions while vehicle is moving.** **Mine roads:** Observe mine speed limit of 25 mph; be aware of other activity on site. **Town roads:** Observe posted speed limit; be aware of pedestrians and other drivers. **Highways:** Observe posted speed limit; avoid passing on 2-lane hwys if possible; drive with daytime headlights to be more visible.	All workers	Frequent Exposure	Serious Consequence	Remotely possible	Low Risk
General Hazard: Weather - Heat stress (hot summer weather) - Cold stress (cold mornings) - High wind conditions & dust storms - Rain & electrical storms - Snow storms	**No**	**No**	**No**	Thermal Motion Electrical	**Heat stress:** Thermal hazard in summer months, workers can become dehydrated, disoriented, less aware of hazards if overheated, sunburn. **Cold stress:** Cold mornings and/or wet conditions can cause cold stress; workers lose dexterity, distracted, potential frost bite. **Wind:** Wind speeds of 20-40 mph are not uncommon, can blow loose items to strike workers, dust can cause limited visibility or irritants in the eyes. **Rain/electrical storm:** Lightning strike to person or equipment could cause burn or electrocution; rain can make walking surfaces slippery and contribute to cold stress. **Snow:** Heavy snow and create white-out with limited visibility; slippery driving conditions.	**No**	Occasional Exposure	Very Serious Consequence	Unusual but possible	Substantial Risk	**No**	**Heat Stress:** Maintain enough water at the work site to keep workers hydrated; provide shade when posisble; monitor worker condition for signs of heat stress. **Cold Stress:** Workers should wear sufficient clothing, change out of wet clothing if possible; be aware of limited desterity; monitor worker condition for signs of cold stress. **Wind:** Tie down or contain loose items on windy days (tent canopy, boxes, etc); shut down operations if winds become severe. **Rain/electrical storm:** Shut down operations on drill rig if lightning visible anywhere on horizon, wait 30 minutes since last strike to restart; be aware of slippery surfaces and put down materials to create traction if posisble. **Snow:** Stop work if visibility is too restricted in white-out condition; do not attempt to drive in white-out if you cannot adequately see the road.	All workers	Occasional Exposure	Serious Consequence	Remotely possible	Low Risk
A. Mobilize equipment to the site	**Yes** Drill rig, support truck; Transport trailer	**No**	**Yes** Driving Safety	Motion Biological Chemical	**Motion:** Movement of large vehicles on highway can result in collision or loss of control; hazardous weather conditions can create additional driving hazards and poor visibility; loading and unloading supplies onto vehicles or vehicles onto transport trailers can result in hand, back or other injuries. **Biological:** Human error, lack of sleep, impaired judgement, cell phone distractions can result in collision or loss of control. **Chemical:** Potential exposure to diesel fuel or other vehicle fluids during refueling or if equipment overturns and spills.	**Yes** Potential fuel spill if equipment overturns	Occasional Exposure	Very Serious Consequence	Unusual but possible	Substantial Risk	**No**	**Motion:** Follow safe driving procedures, proper following distance; ensure loads are secured; modify driving speed based on weather conditions or postpone trip if conditions are unsafe; only trained and competent persons can operate forklift/skid loader and must follow safe procedures. **Biological:** Drivers should be trained, liscenced, have driver safety training. Cell phone use while driving is not allowed. **Chemical:** Notify fuel station attendant or emergency responders if fuel has spilled so they can use materials to control or cleanup spill, be aware of increased fire potential and keep distance.	Boart drill crew	Occasional Exposure	Serious Consequence	Remotely possible	Low Risk
B. Clear boreholes for potential underground utilities using hand auger and/or air knife methodologies. - Cannot clear actual borehole location because shallow soil sample must be collected. Clear around borehole. - Clear to depth of 6.5' - Unattended hole must remain covered or backfilled until drilling operations commence. - Visual check of hole to confirm no utilities encountered.	**Yes** Air knife & vac truck	**No**	**Yes** Ground Disturbance	Motion Electrical Pressure	**Motion:** Use of hand auger could result in twisting and back strain. Flying debris/soil during air knifing. **Electrical:** Potential for "soft" contact with underground electrical line, potential to hit it but not likely to break insulation. **Pressure** - High pressure air from air wand could injure eyes or skin if directed at a person. Noise from air knife could injure hearing. Suction of vacuum could latch on to clothing, skin or body parts and cause bruising or abrasion.	**No**	Frequent Exposure	Serious Consequence	Unusual but possible	Substantial Risk	**Yes** Ground Disturbance	**Motion:** Use proper body position and trade off workers when doing hand auger (collapse of hole trapping auger is not expected in this material type); face shield required when using air knife. **Electrical:** Use mirror or light to inspect hole when something is encountered to identify if it is utility or just a rock. **Pressure** - Only trained and certified operators, reminder to never point wand at a person. Turn off vacuum if need to unclog suction hose.	Boart drill crew	Frequent Exposure	Serious Consequence	Unusual but possible	Substantial Risk

Job Risk Assessment

Work Plan (List Job Steps) List the jobs required to complete the project scope in the sequence they are carried out.	Any tools or heavy equipment needed? If YES, What Type	Is this a SIMOP? If YES, Include in Mitigation Plan.	Do any of the *Golden Rules of Safety* apply? If YES, Which of the 8?	Which of the 8 energy or biological root sources could possibly be involved in this job?	**What** would be the result of exposure to a biological or energy source? (e.g., Bites, Slips, trips, falls, exposures, electrocution, injury, death, etc.); and **How, where, or when** could an uncontrolled release or unwanted contact with a biological or energy **Note:** Humans are biological sources, and their physical abilities, competency, and training should also be considered here.	Environmental Impacts Could there be a release to the air, soil or water, and or, will a waste be generated? If YES, What?	Pre-Mitigation Risk Evaluation Frequency	Consequence	Likelihood	Risk Score	Permit(s) Required? If YES, What kind?	Energy / Biological / Waste Management Plan List control measures required to eliminate, control, or protect against unwanted contact with an uncontrolled biological or energy source to minimize the risk of injury or environmental Impact. **Hierarchy of Controls:** Elimination, Substitution, Isolation, Engineering/ Administrative, PPE	Who is responsible for Hazard Mitigation? Name or Title	Post-Mitigation Risk Evaluation Frequency	Consequence	Likelihood	Risk Score
C. Drill boreholes to 50 ft bgs (Geoprobe Drill) - Set drill rig at cleared borehole location - Drill borehole - Collect continuous core in acetate core sleeves.	**Yes** Geoprobe Drill rig	**Yes**	**Yes** Ground Disturbance	Motion Gravity Pressure Biological Chemical Electrical	**Motion:** Movement of drill rig could strike someone when setting up; downward or rotating motion of drill head could entangle a person; handling or connecting drill pipe could cause hand, back or body injury. **Gravity:** Raised mast creates potential hazard of falling objects or dangling cable lines; handling drill rod could result in hand or back injury. **Pressure:** Pressurized hydraulic lines could spray hot fluid or strike a person; noise pressure creates hearing loss potential. **Biological:** Inexperienced visitors entering work area are at risk of numerous hazards. **Chemical:** Potential contact with diesel or gas fuel when refueling rig or equipment (fire hazard). **Electrical:** Risk of contact with overhead power lines in select areas or with underground utilities causing serious burn, injury, electrical shock or fatality.	**No**	Continuous Exposure	Very Serious Consequence	Quite Possible	Very High Risk	**Yes** Ground Disturbance	**Motion:** Only authorized persons allowed in drill zone, communicate with workers when entering drill zone; wear leather or rubber palmed gloves when doing any manual handling including making pipe connections; complete ground disturbance permit. **Gravity:** Ensure loose equipment or cables are adequately secured. **Pressure:** Pre-operation inspections of equipment to identify potential failures before they happen; wear hearing protection. **Biological:** Place barricades or caution tape to demark restricted area and keep unauthorized persons out; ensure all operators are trained and qualified on each piece of equipment. **Chemical:** Protect against drips and spills when refueling (plastic tarp or work on pavement); wear rubber palmed or nitrile gloves when handling equipment that has been in contact with suspected contaminated groundwater. **Electrical:** Inspect work area for presence of overhead power lines, use a spotter if working within 40 feet; do not move drill with raised mast. Confirm utility clearance has been completed at exact borehole location by checking GD permit.	Boart drill crew	Continuous Exposure	Serious Consequence	Remotely possible	Substantial Risk
D. Geologist to log soil core lithology and collect sample for lab submittal - Cut open acetate sleeve with hooked blade - Inspect and log lithology - Seal and package cores for lab submittal by putting bubble wrap in ends, caps, tape and place in cooler	**No**	**Yes**	**No**	Motion	**Motion** - Use of hooked blade to open core sleeves has potential for hand laceration. Sharp edges of cut sleeve also can cause hand laceration.	**No**	Continuous Exposure	Serious Consequence	Unusual but possible	High Risk	**No**	**Motion -** Wear leather or other appropriate gloves to protect hands from sharp edges; training for workers to be aware of the high hazard. Use a hooked blade and secure the core sleeve to prevent accidental rolling when cutting. Handle open core sleeves with care, never with unprotected hands.	BC geologist	Continuous Exposure	Notable Consequence	Remotely possible	Minimal Risk
E. Decon drill rod and casing with pressure washer and/or hose between boreholes - Drive pipe truck to decon area - Use pressure washer to wash drill pipe on truck	**Yes** Pressure washer	**Yes**	**No**	Pressure Motion	**Pressure:** Pressurized water stream can cause injury to skin or eyes if directed at a person or if splashed back onto a person. **Motion:** Handling of drill rods and casing can cause back strain, muscle strain, pinched hand injuries.	**Yes** Wash water may contain contaminants from well water or soil which could be released to the soil if not contained	Occasional Exposure	Serious Consequence	Unusual but possible	Low Risk	**No**	**Pressure:** Workers should wear safety glasses, face shield and gloves when using pressure washer; only authorized and competent workers should operate pressure washer and an exclusion zone should be established to keep others out of the hazard area when operating. **Motion:** For lifts >50 lbs use 2-person lift; ensure workers are trained in proper lifting techniques. Wear leather or rubber coated gloves when handling materials.	Boart drill crew	Frequent Exposure	Important Consequence	Remotely possible	Minimal Risk
F. Abandon borehole - Pour bentonite chips down borehole	**No**	**Yes**	**No**	Gravity	**Gravity:** Handling of heavy bags of bentonite could cause muscle strain or back injury	**No**	Occasional Exposure	Serious Consequence	Unusual but possible	Low Risk	**No**	**Gravity**: Get assistance handling heavy bags of grout mix or only use lighter bags <50 lbs.	Boart drill crew	Frequent Exposure	Important Consequence	Remotely possible	Minimal Risk